

New Mexico Environmental Literacy Plan



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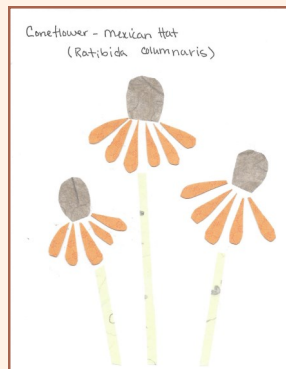
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**The Environmental Education Association of New Mexico
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New Mexico Environmental Literacy Plan



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INTRODUCTION

Definition of Environmental Literacy adapted from the North American Association for Environmental Education (NAAEE):

An environmentally literate person is someone who, both individually and together with others, makes informed decisions concerning the environment; is willing to act on these decisions to improve the well being of other individuals, societies, and the global environment; and participates in civic life. Those who are environmentally literate possess, to varying degrees:

- ♦ *the knowledge and understanding of a wide range of environmental concepts, problems, and issues;*
- ♦ *the appropriate behavioral strategies to apply such knowledge and understanding in order to make sound and effective decisions in a range of environmental contexts.*

New Mexico's Environmental Literacy Plan (ELP) will ensure that New Mexico school children engage in environmental education from pre-kindergarten through graduation, with curricula that cover the breadth and depth necessary to inspire them to protect and improve the environment both as children and later as adult citizens. Environmental education, fully integrated into existing curricula and standards, will provide the necessary structure for growing young children into stronger and wiser adults.



New Mexico's landscape and population are among the most diverse in the country. The outdoor world with its gorgeous rugged landscapes is home to high levels of biological diversity resulting from the state's geographic location, topography and geologic history. Pueblo culture originated in New Mexico more than 1,500 years ago, and Spaniards arrived about 500 years ago, laying the foundation for a culturally diverse state. Today New Mexico is the 6th most diverse state, with 46% Hispanic, 10% American Indian, and 2% African American citizens.

Despite New Mexico's rich cultural and geographic resources, the state suffers from some of the country's toughest challenges. NM is one of the poorest states, ranking 43rd in median household income. In 2011, 31% of the state's children were living below the poverty level. Poverty is associated with obesity. In 2011, 19.9% of 3rd graders in NM were obese. For American Indian 3rd graders, the percentages were higher—29.9%. These numbers represent recent modest declines in childhood obesity rates, but are still dangerously high (NM Dept. of Health, 2015). Childhood obesity increases the risk of Type 2 Diabetes, high cholesterol and high blood pressure and other precursors lead to heart disease. Children who adopt healthy habits early reduce their likelihood of developing chronic diseases as adults. At the same time, NM children suffer the highest rates of food insecurity in the country, 30%. (Frohlich, 2015). The trend in recent years, however, has been for children to decrease their time outdoors while increasing their time using digital media. In 2010, the average time

INTRODUCTION

An important goal of K-12 education is that our students understand and appreciate the natural world and our place in it. An environmentally literate student demonstrates knowledge of the circumstances and conditions affecting the environment, particularly as relates to air, climate, land, food, energy, water and ecosystems.

spent by 8-18 year olds on digital media was over 7 1/2 hrs. per day, 7 days a week (Rideout, 2010). Incorporating health and wellness into the ELP addresses this urgent public health issue by getting students outside and teaching them about healthy lifestyles and nutrition.

The environment may be used as an integrating context for learning, as it lends itself to multidisciplinary teaching. A school's surroundings and community also contribute to a framework within which students, guided by teachers and administrators, can construct their own learning.

Environmental education has been shown to reap many benefits including:

- ◆ Increased engagement and enthusiasm for learning;
- ◆ Greater pride and ownership in accomplishments;
- ◆ Reduced discipline and classroom management problems;
- ◆ Better performance on standardized measures of academic achievement in reading, writing, math, science, and social studies.
- ◆ Healthy bodies, better nutrition and lowered risk of obesity and diabetes.

(Lieberman and Hoody, 1998).

Teaching about the environment is by no means new to New Mexico, nor is it impossible under current conditions. The ELP is needed so that environmental education will be recognized, supported and valued as an essential part of every child's education.

New Mexico has a long conservation history. In fact, Aldo Leopold, author of the forward-thinking *Land Ethic*, lived in New Mexico from 1911 to 1924, and returned often through his life. Historians agree that his time in the Southwest was critical to the formation of his understanding of natural systems and to the eventual *Land Ethic* he would draft. He is now known worldwide for his important conservation ideas advocating "a state of harmony between man and nature." Today, we have much work to do to restore that harmony as we grapple with complex issues of climate change, resource depletion and degradation of the environment. New Mexico's environment, economy and communities depend on a citizenry who can make decisions about air and water quality, the health of forests, ranch and agricultural lands, how to meet energy needs, wildlife preservation, and how to provide opportunities for residents and visitors to enjoy the state's natural bounty while protecting it for future generations.

Transforming our schoolchildren's experience, education and motivation to steward our natural resources requires coordination and commitment from a variety of sources. Teachers bear the primary responsibility of providing the education and field experiences as described in this plan. Their work is only achieved successfully with the full support and partnership of their principals and administration. Therefore, to fully implement the ELP, it must be adopted by the New Mexico Public Education Department with adequate funding to support the goals and objectives of the plan. Broad and informed support of administrators at each level of the administrative structure will enable teachers to provide the education and field experiences that will foster environmental literate students.

ABOUT ENVIRONMENTAL EDUCATION

All teachers are environmental educators, as they help their students interpret the world around them, whether through science, math, social studies, language arts, art, or music.

What is environmental education?

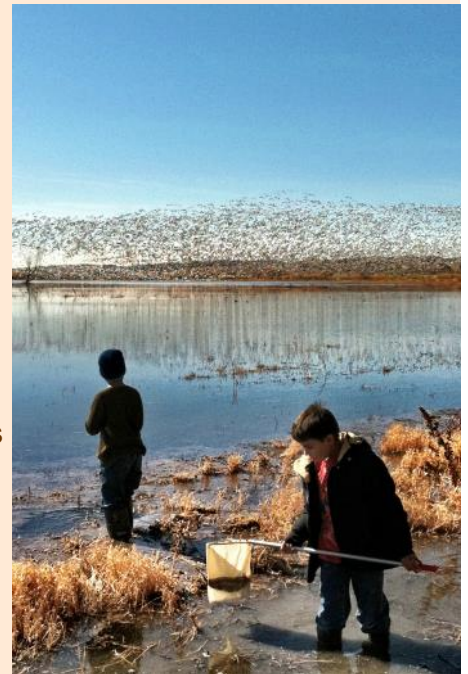
The North American Association for Environmental Education defines environmental education:

Environmental education (EE) teaches children and adults how to learn about and investigate their environment, and to make intelligent, informed decisions about how they can take care of it.

EE is taught in traditional classrooms, in communities, and in settings like nature centers, museums, parks, and zoos. Learning about the environment involves many subjects—earth science, biology, chemistry, social studies, even math and language arts—because understanding how the environment works, and keeping it healthy, involves knowledge and skills from many disciplines.

EE works best when it is taught in an organized sequence. In schools, EE often reflects state and national learning standards. EE not only leads to environmentally literate people, but also helps increase student academic achievement.

EE is an interdisciplinary and inquiry-based approach to education. It integrates hands-on, project-based classroom and community experiences with outdoor, place-based, in-the-field learning experiences in order to achieve an understanding of the environment as a whole. This kind of integration creates relevance and context, preventing the lack of connection students often experience when learning and teaching is approached without moorings. Students not only broaden their understanding of the natural world, but are also actively engaged in activities that have an impact on the world around them. EE allows students to learn through service to their community and to their environment.



Studies have found that spending more time in nature promotes greater emotional well being, contributes to the development of healthier habits through physical activity, has a positive impact on students who identify as ADD or AD/HD, and improves self-discipline (Kuo & Taylor, 2004). In field experiences, students make new social connections by placing them in contact with new people, issues, and dynamic environments. In addition to learning and serving, children need an opportunity to be free and playful, to be outdoors and experience nature on their own terms, to feel the sense of magic and wonder in nature and be connected to the natural world that sustains them.

COMMON CORE

New Mexico schools are transitioning to Common Core State Standards for English Language Arts and Mathematics. They will be fully implemented by the end of the 2014—2015 school year.



The New Mexico Common Core State Standards (NMCCSS) for English Language Arts and Mathematics were adopted in 2010. The English Language Arts Standards address reading, writing, speaking and listening, language, and media and technology. The Mathematics Standards address numeracy at the K-5 level, robust preparation for high school mathematics at the 6-8 level, and call on high school students to practice applying mathematical ways of thinking to real world issues and challenges. Environmental literacy topics and skills are a seamless fit with CCSS and their application to real-world issues and challenges. CCSS calls for students to read, write and speak about a variety of subjects across disciplines.

Because CCSS offers teachers a great deal of choice in curricular material, the rich content possibilities inherent in environmental education will provide meaningful opportunities for students to master both English Language Arts and Mathematics Standards. While CCSS strives to foster deep understanding in the subject of study and gives students the tools to apply their knowledge, EE can provide the context. Studying the natural world through fieldwork and service learning involves students in their communities and helps them develop critical thinking and practice communicating ideas orally and in writing. Data



collection, monitoring, and other outdoor study helps students with CCSS Mathematical Practice Standards that involve solving problems, using reasoning, communication, and Process Standards like using appropriate tools and attending to precision. Environmental topics can also be addressed through media and technology literacy.

It is imperative that environmental topics are woven into CCSS instead of being an extra or “added-on” component. Environmental program providers must become familiar with CCSS and communicate how their programs address CCSS requirements.



The Next Generation Science Standards (NGSS) were published in Spring 2013. A result of a collaboration between several national organizations--the National Research Council, the American Association for the Advancement of Science, Achieve, and the National Science Teachers Association--and a coalition of 26 states, NGSS represents the collective work of thousands of scientists and educators. NGSS has a tight connection to the Common Core State Standards, with links to both literacy and mathematics. As of Fall 2013, New Mexico had not yet adopted NGSS, although signs point to their eventual adoption in the state.

Environmental literacy is strongly supported by NGSS, both through the framework that organizes the standards and through the individual standards themselves. The framework has three dimensions: Scientific and Engineering Practices, Cross-Cutting Concepts, and Disciplinary Core Ideas. Students engaged in fieldwork will have the opportunity to engage in Scientific Practices; students designing solutions for environmental problems will engage in Engineering Practices. Virtually all units of study related to the environment will provide opportunities for students to learn Crosscutting Concepts. Environmental concepts are particularly well-represented in the Disciplinary Core Ideas related to the Life and Earth and Space Sciences, especially Ecosystems, Earth's Systems, and Earth and Human Activity.

Scientific and Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

1. Patterns
2. Cause and effect; Mechanism and explanation
3. Scale, proportion, and quantity
4. Systems and system models
5. Energy and matter; Flows, cycles, and conservation
6. Structure and function
7. Stability and change

Disciplinary Core Ideas

Physical Sciences

PS1: Matter and its interactions

PS2: Motion and stability; Forces and interactions

PS3: Energy

PS4: Waves and their applications in technologies for information transfer

Life Sciences

LS1: From molecules to organisms; Structures and processes

LS2: Ecosystems: Interactions, energy, and dynamics

LS3: Heredity: Inheritance and variation of traits

LS4: Biological evolution: Unity and diversity

Earth and Space Science

ESS1: Earth's place in the universe

ESS2: Earth's systems

ESS3: Earth and human activity

Engineering, Technology and Applications of Science

ETS1: Engineering design

ETS2: Links among engineering, technology, science, and society

STEM AND EE

Environmental education is an integral part of STEM, as much of science addresses the environment. In addition, technological innovation is often closely tied to addressing our environmental challenges.

STEM—Science, Technology, Engineering and Math

Hands-on environmental education projects enrich STEM learning and offer an exciting opportunity to engage more students in STEM. The possibilities are endless – from calculating school water usage to observing, documenting & protecting wildlife populations in the schoolyard. The interactions between human activities and the environment are replete with STEM-related investigations, that will best prepare our students for adult career possibilities.

Future jobs in STEM fields will include many that directly address environmental challenges or issues, while most will require awareness and accommodation for environmental and sustainability requirements. Climate



change will be a driver of innovation to address warming climate and extremes of precipitation. Dwindling natural resources will require increased efficiencies of materials and product life and use. Indeed, there may be few STEM-related jobs in our future that do not require the awareness, knowledge and skills gained through environmental education.

Green Jobs

According to the United Nations Green Jobs report, green jobs are those that contribute appreciatively to maintaining or restoring environmental quality and avoiding future damage to the Earth's ecosystems. These green goods and services jobs totaled 3.4 million in 2011 (2.6 percent of total employment) according to the Bureau of Labor Statistics.

Headwater Economics, an independent, non-partisan research company, found that while the total number of jobs in New Mexico grew only 13 percent from 1995 to 2007, green jobs grew by 62 percent thanks to prospective solar energy developments. With this job growth, the state has seen an increase in green-related higher education courses and programs.

Renewable energy, clean manufacturing, energy efficiency and jobs in research, development and administration are some of our state's core green jobs. Many of these jobs require a strong STEM background, and need considerable preparation. Green business also creates vocational careers such as solar panel installation and development of new green grids.

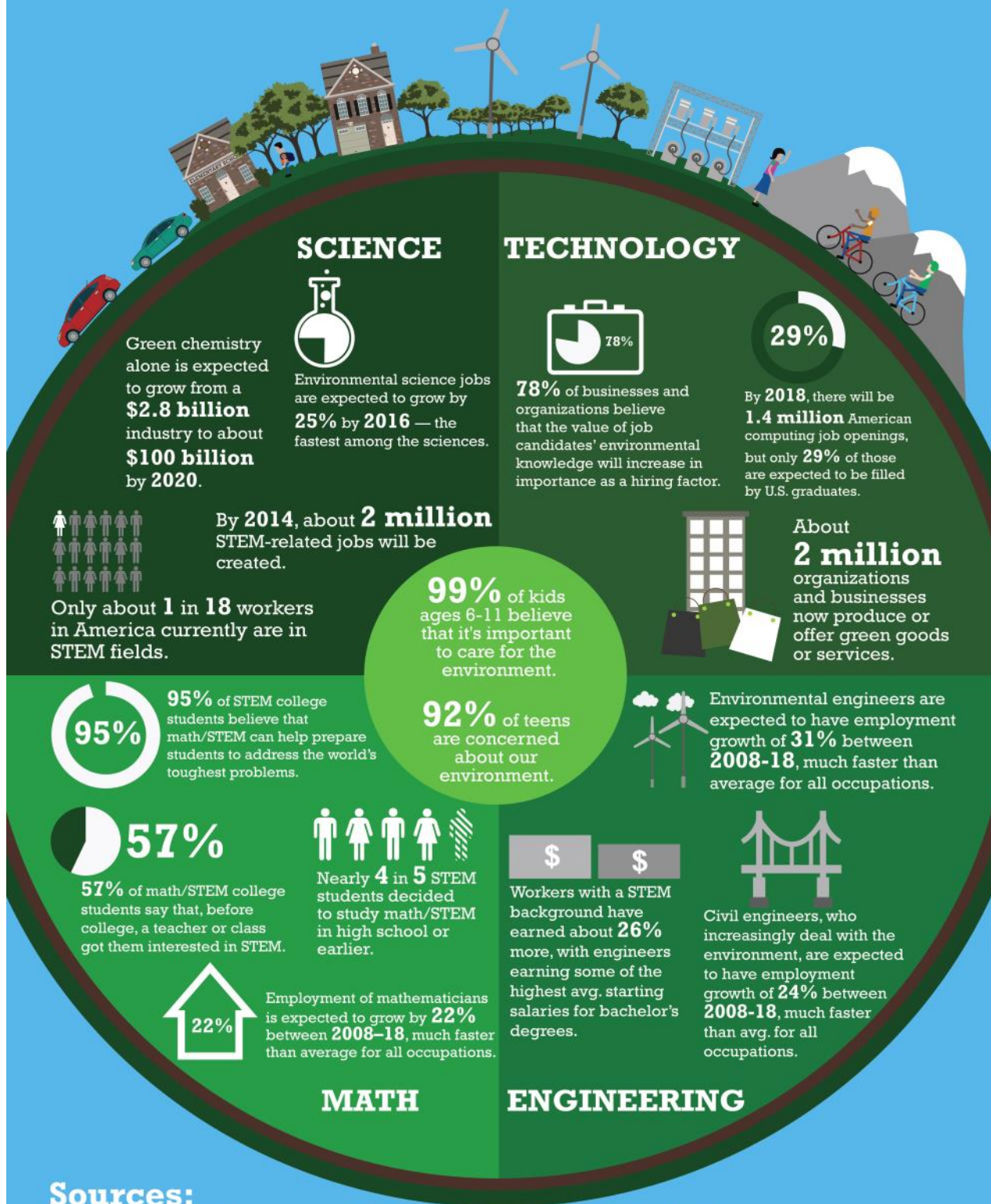
Jeniffer Tabola of the National Environmental Education Foundation states that “young people who experience the natural world and have more opportunities to play and learn within it are more likely to choose science or related fields as careers.”

STEM + EE = GREEN JOBS



STEM & Our Planet

The environment is a compelling context for teaching and engaging today's students in science, technology, engineering and math (STEM).



Sources:

Boys & Girls Clubs of America
Bureau of Labor Statistics, U.S. Dept. of Labor
Business & Environment Program of NEEF
Economics and Statistics Administration, U.S. Dept. of Commerce
Harris Interactive

Kelton Research
National Center for Women & Information Technology
NC STEM Community Collaborative
Pike Research
Rutgers, The State University of New Jersey

Find out more: www.eeweek.org

NO CHILD LEFT INSIDE

The proposed No Child Left Inside legislation will provide funding to State Public Education Departments to implement Environmental Literacy Plans (ELPs). So far, 48 states have either completed or are in process of developing their ELPs.

No Child Left Inside Act 2015 - *proposed federal legislation*

ENVIRONMENTAL LITERACY PLAN- The term “environmental literacy plan” means a plan developed, approved, or sponsored by the State educational agency in consultation with State environmental agencies, State environmental education associations, and State natural resource agencies, and with input from the public, that:

- A) prepares students to understand ecological principles, the systems of the natural world, and the relationships and interactions between natural and man-made environments;
- B) provides field and hands-on experiences as part of the regular school curriculum and creates programs that contribute to healthy lifestyles through outdoor recreation and sound nutrition;
- C) provides environmental service learning opportunities;
- D) provides targeted professional development opportunities for teachers that improves the teachers':
 - (i) environmental and natural resource content knowledge; and
 - (ii) pedagogical skills in teaching about the environment, including the use of:
 - (I) interdisciplinary, field-based, and research-based learning; and
 - (II) science, technology, engineering, and mathematics content knowledge and tools;
- (E) describes the measures the State will use to assess the environmental literacy of students, including:
 - (i) relevant State academic content standards and content areas regarding environmental education, and courses or subjects where environmental education instruction will be integrated throughout the prekindergarten through grade 12 curriculum; and
 - (ii) a description of the relationship of the plan to the secondary school graduation requirements of the State;
- (F) describes how the State educational agency will implement the plan, in partnership with nongovernmental organizations, Federal agencies, State environmental agencies, State environmental education associations, State natural resource agencies, and local educational agencies, including how the State educational agency will secure funding and other necessary support; and
- (G) is periodically updated by the State educational agency not less often than every 5 years.

No Child Left Inside®



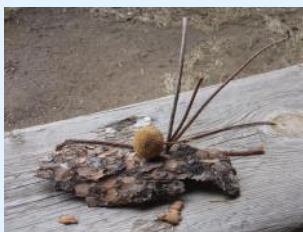
GOALS OF THE PLAN

Mission

Provide a foundation for student and educator learning, consistent with state and national education standards (Common Core, Next Generation Science Standards and NM Educational Standards), that results in environmentally literate graduates.

Vision

New Mexico fosters an environmentally literate citizenry that practices personal and collective stewardship, lives sustainably, and respects New Mexico's cultural diversity and traditions.



The Environmental Literacy Plan has six goals that are described in chapters that follow. All recommendations are consistent with Common Core State Standards, the Next Generation Science Standards, and New Mexico Content Standards.

Goal 1: Student Preparation

Students receive multidisciplinary environmental education from pre-kindergarten through 12th grade; they graduate with the critical thinking skills and the commitment to take individual and collective action toward addressing environmental challenges.

Goal 2: Field Experiences

Students participate regularly in educational field experiences and service learning that take place outside the classroom.

Goal 3: Health and Wellness

Students adopt healthful lifestyles by engaging in outdoor recreation and sound nutrition.

Goal 4: Professional Development

Educators have the resources, training, and support to integrate environmental and sustainability literacy into all disciplines to inspire students to explore, investigate, and learn about the natural world and its systems.

Goal 5: Facilities

Facilities School campuses are designed and built with environmental and energy-efficiency standards to support environmental education and sustainable practices on site.

Goal 6: Assessment

Students are assessed of their environmental literacy by meaningful measures.

Goal 7: Implementation

The Public Education Department implements the plan with support from nonprofit and governmental agencies.

GOAL 1—STUDENT PREPARATION

Goal: Students receive multidisciplinary environmental education from pre-kindergarten through 12th grade; they graduate with the critical thinking skills, environmental knowledge and the commitment to take individual and collective action toward addressing environmental challenges.

Objective 1: Provide rigorous, multidisciplinary EE that meets Common Core Standards, the NM Curriculum Standards, the Next Generation Science Standards, and the NAAEE Guidelines for Excellence in Environmental Education.

- a. Correlate the Guidelines for Excellence in Environmental Education to New Mexico State Standards and Common Core and Next Generation Science Standards. Annotate comprehensively with examples.
- b. Develop a comprehensive list of alignments between ELP and the standards and guidelines so that teachers can integrate Environmental and Sustainability Education can be integrated into their existing curricula.
- c. Provide rigorous STEM education that includes a foundation in ecological principles and climate science.
- d. Develop a standards-related theme for each grade level that builds awareness, knowledge, critical thinking, problem solving, scientific prediction with variable outcomes, decision making, action, and stewardship.
- e. Students understand the anthropogenic causes and current and forecasted effects of climate change.
- f. Students understand roles, feedback loops, forms and processes and how these inform sustainability-engineered designs (biomimicry) in the natural and man-made world.
- g. Students evaluate, measure and analyze the school campus, buildings and operations for efficiency of energy and water use; address inefficiencies and waste by researching and implementing more sustainable systems (e.g. recycling, waste management, resource conservation).



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GOAL 1—STUDENT PREP. CONTINUED

Objective 2: Foster student understanding of how their actions affect the environment and future generations leading to informed behavior and decisions.

- a. Identify and provide students with multiple, varied and ongoing opportunities to participate in both unstructured free exploration of nature as well as structured learning activities to develop a strong personal relationship with nature.
- b. Students engage in systems thinking, where they observe and analyze systems in nature, geopolitics, socio-economics and how those factors influence each other.
- c. Create opportunities that allow students to envision and create a sustainable future.
- d. Expose students to fiction that stimulates the imagining of possible futures.
- e. Provide sustainability education and opportunities for students to explore ways to reduce, reuse and recycle.



Objective 3: Use research-based instructional strategies that are rooted in the community, culture and local geography.

- a. Create curricula for EE that is place-based and linked to New Mexico's unique cultural and geographical heritages; incorporate student's cultural heritage into learning opportunities.
- b. Include project-based learning, service learning, artistic expression, and environmental health activities to engage students, particularly those who are underserved.
- c. Identify and work with community leaders to engage students in caring for New Mexico's environment.
- d. Students learn about environmental justice and the disproportionate siting of environmentally hazardous situations in lesser advantaged communities.

Objective 4: Increase the availability of green/sustainability career education for students of all ages.

- a. Incorporate New Mexico's unique advantages in renewable energy careers.
- b. Introduce students to careers in the sciences that allow them to interact directly with New Mexico's environment (e.g. engineering, geology, hydrology, botany, biology, etc.).
- c. Embed sustainability career possibilities into all existing career pathways.
- d. Encourage avenues for sustainability entrepreneurship.
- e. Partner with post-secondary institutions to create career pathways and opportunities to learn about sustainability.



GOAL 2– FIELD EXPERIENCES

Goal: Students participate regularly in educational field experiences and service learning that take place outside the classroom.

Objective 1: Students at every grade level spend time outside, become aware of nature, and make connections to places.

- a. Students have daily access to nature on school grounds (e.g. on-campus gardens, compost and vermiculture sites, schoolyard habitats, greenhouses).
- b. Students' classroom learning is enriched through field experiences that may be extended, extrapolated, and interpreted globally.
- c. Students learn about and engage in the cycle of food production (e.g. consumption, compost, and reuse).

Objective 2: Students observe natural phenomena and gather, record, analyze data, and present findings related to natural systems.

- a. Students use multiple senses to observe nature to look for patterns, functions and change over time.
- b. Students compare local findings with other similar programs and/or with students from other cultures and environments.
- d. Students engage in citizen science and present results of studies and projects to local community.
- e. Student's use current field-based technology to support and enhance learning.



Objective 3: Students engage with community to learn about historic and cultural practices.

- a. Students conduct ethnobiological studies, interviewing local elders to understand how humans have and continue to use local plants and animals for medicine, fibers, food and construction.
- b. Students interview community elders, create oral histories of past landscape use, and research how local peoples treated and managed the natural resources.
- c. Students visit Native American and Hispanic cultural centers/gardens and traditional ceremonial outdoor spaces.
- d. Students learn traditional living skills such as building hornos, collecting edible plants, and making tools and plant dyes.



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GOAL 2- FIELD EXPERIENCES CONTINUED

Objective 4: Students engage in stewardship, sustainable practices, restoration and mitigation. Students report their findings to their community.

- a. Students learn how humans have changed the ecosystem balance in their immediate and remote environments.
- b. Students participate in hands-on restoration of habitat and natural places within their community.



Photo: Wild Earth Guardians



GOAL 3—HEALTH AND WELLNESS

Goal: Students adopt healthful lifestyles by engaging in outdoor recreation and sound nutrition.

Objective 1: Students learn about and engage in outdoor recreation, both on and off-campus.

- a. Student's preK-5 have opportunities for unstructured play, enhancing development of creative thinking, with time left unstructured for their free exploration.
- b. Students pre-K through 8th grade participate in curriculum-based physical education as part of the regular school day.
- c. Students participate in field trip opportunities in partnership with recreation providers.
- d. Students are encouraged to walk, bike and use non-motorized means to and from school.



Objective 2: Students learn about and engage in sound nutrition.

- a. Students learn about energy flow and nutrient cycles in biological systems and how they can promote health and well-being.
- b. School gardens provide nutritious food and opportunities to physically work outdoors.
- c. Cafeterias provide healthy choices and local food as much as possible.
- d. Students learn and experience the benefits of making healthful food choices.
- e. Students learn about local and global food production, including visits to farmers markets to sample locally grown food and learn the importance of locally sourced food on human and environmental health.



Environment and ADHD



Researchers at the Human Environment Research Laboratory at the University of Illinois at Urbana-Champaign, have found that spending time in ordinary "green" settings—such as parks, farms or grassy backyards—reduces symptoms of ADHD when compared to time spent at indoor playgrounds and man-made recreation areas of concrete and asphalt. The findings were consistent regardless of the child's age, gender, family income, geographic region or severity of diagnosis. (Taylor and Kuo, 2004).

GOAL 4– TEACHER PREPARATION

Goal: Educators have the resources, training, and support to integrate environmental and sustainability literacy into all disciplines to inspire students to explore, investigate, and learn about the natural world and its systems.

Objective 1: Ensure that undergraduate coursework for preservice teachers includes environmental and sustainability literacy, as required by the New Mexico Administrative Code.

- a. Work with education-degree-granting institutions to ensure that environmental and sustainability literacy topics and competencies are included in courses.
- b. Provide support for professors who teach courses that serve undergraduate and graduate education majors including but not limited to the natural sciences, social sciences, history, and literacy.
- c. Incorporate environmental education into pre-service and in-service training for teachers as a tool for implementing the Common Core State Standards and the Next Generation Science Standards.



Objective 2: Develop an endorsement in environmental education that can be added to an existing New Mexico teaching license (early childhood, primary, and secondary).

- a. Research environmental education endorsements in other states to document best practices and strategies for implementation.
- b. Engage with the Public Education Department and Higher Education Department to develop the endorsement and implement through an amendment to the New Mexico Administrative Code.

Objective 3: Provide job-embedded professional learning opportunities for in-service teachers that incorporate best practices as defined by the North American Association for Environmental Education (NAAEE).

- a. Collaborate with school districts to jointly plan and implement professional learning.
- b. Ensure that environmental and sustainability education professional learning opportunities are publicized to schools and school districts.



GOAL 4– TEACHER PREP. CONTINUED

Objective 4: Build school administrators' awareness of and support for environmental and sustainability education.

- a. Build relationships with administrators' professional organizations, e.g., New Mexico School Superintendents' Association (NMSSA).
- b. Build relationships with colleges of education that confer administrative degrees.
- c. Provide environmental and sustainability education professional learning for administrators.

Objective 5. Develop a cadre of highly-trained environmental and sustainability informal educators.

- a. Ensure that the teacher professional learning programs delivered by informal educators contain the features outlined in NAAEE Guidelines for Excellence Environmental Education series.
- b. Develop an Environmental Education Certification program, open to both formal and informal educators.



Objective 6: Improve educators' awareness of environmental and sustainability education resources.

- a. Create or use an existing website for teachers to easily access existing curricula, data sets, local scientists, resources, and other environmental and sustainability education programs.
- b. Support professional development networking, conferences and other means of increasing resource and knowledge sharing.



GOAL 5—FACILITIES

Goal 5 - School campuses are designed and built with environmental and energy efficiency standards to support environmental education and sustainable practices on site.

Objective 1: Existing schools are analyzed to determine current water and energy consumption, and amount of waste produced.

- a. Water and energy use audit information will be performed by or be accessible to teachers and students for curriculum and planning purposes.
- b. Actual school energy and water bills are used in math and science classes for evaluation and analysis.
- c. School buildings are explored by students with teacher guidance to determine opportunities for improvements.
- d. Students' efforts that result in improvements are recognized.

Objective 2: When existing schools are renovated, plans will include improvements to both the indoor and outdoor areas to facilitate students' environmental learning and to model sound environmental practices.

- a. Students participate in designing entire landscape for wildness, sustainability and accessibility (including handicapped) to all classrooms, including natural and sustainable outdoor classrooms that surround the school and are part of the playspace and overall landscaping plan. Students will collaborate with those who manage the design and maintenance of school grounds.
- b. Renovations made to outdoor spaces will provide outdoor shelter and classroom space to encourage outdoor activities with natural materials.
- c. Updates to any appliances to a Green or Energy Star standard
- d. Updates to building components will adhere to a Green standard.

Objective 3: New Facilities - New facilities built will include both the indoor and outdoor areas to facilitate students' environmental learning and to model sound environmental practices.

- a. Allow students, parents and teachers to collaborate in the planning.
- b. Situate buildings to take advantage of solar gain as appropriate.
- c. Maximize efficiencies of water and energy use.
- d. Use natural lighting for classrooms, balanced with thermal insulation and efficient instructional technology.
- e. Facilitate the reduction of campus waste products, such as providing space for recycling and composting activities, aiming for zero waste.
- f. Provide all classrooms with convenient access to the outdoors.
- g. Provide shade to west side of buildings with trees, awnings or portals.
- h. Outdoors, provide permanently shaded gathering spaces big enough for at least an entire class.
- i. Landscape with native and xeric plants. Provide wildlife habitat.
- j. Use durable products in construction that have low volatile organic compounds (VOC).
- k. Provide parking lot spaces for hybrid, electric and carpool vehicles.
- l. Consider an installing an electric car recharging station.
- m. Work with the local government to provide safe routes to school with sidewalks, crosswalks, appropriate lighting and separated bike lanes for walking and biking.
- n. Include natural materials in playspaces outside.

GOAL 5—FACILITIES CONTINUED

Objective 4: School staff and systems will utilize sustainable practices in maintenance and operations.

- a. Use nontoxic chemicals for cleaning school grounds.
- b. Reduce or eliminate the use of non-biodegradable materials such as Styrofoam and plastic.
- c. Procurement practices in all departments are evaluated to determine if environmental impacts can be reduced.
- d. Separate and compost kitchen food waste or find an outside customer for it.
- e. Re-use or recycle metal, plastic, paper and cardboard waste where feasible.
- f. Capture stormwater runoff for irrigation use.
- g. Practice Integrated Pest Management that reduces the use of toxic pesticides.
- h. Establish and publish conservation and sustainability goals each year for the school with the participation of the school community.
- i. Use lighting and irrigation meters and controls to measure, manage and reduce electricity and water use.
- j. Create and enforce a no-idling policy in school pick up zones to improve outdoor air quality at dismissal times.

GOAL 6—ASSESSMENT

Goal: Students are assessed of their environmental literacy by meaningful measures.

Objective 1: Collect baseline information of student performance in environmental literacy concepts within current standards.

- a. Identify grade-level curricular areas in Science, Mathematics and Language Arts, that integrate environmental literacy concepts and support the CCSS and NM Science Standards.
- b. Identify measures of students performance in environmental literacy concepts embedded in the curriculum and in publisher-based science programs currently used in New Mexico.
- c. Identify measures of student performance in environmental literacy concepts currently used in other CCSS states.

Objective 2: Incorporate environmental literacy into future student assessment tools.

- a. Equip classroom teachers with the tools to create and/or administer pre-designed in-class assessment tools that measure standards-based performance.
- b. Partner with district Assessments administration and test vendors to include required items in the Interim Assessments (PED-mandated tests).
- c. Review options for increasing the number of environmental education-based questions on the NM Educational Assessment for Science at grades 5, 8, and 11.

GOAL 7– IMPLEMENTATION

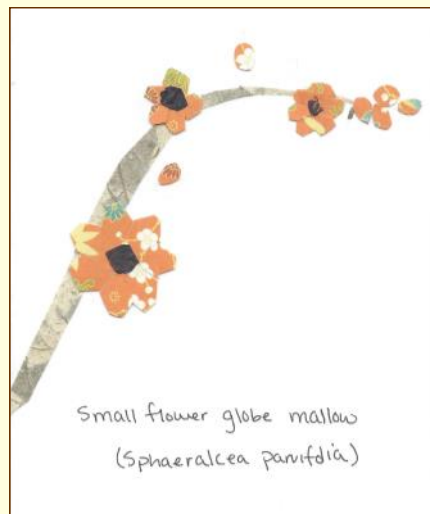
Goal: The Public Education Department implements the New Mexico Environmental Literacy Plan with support from nonprofit and governmental agencies.

Objective 1: The Public Education Department adopts the New Mexico Environmental Literacy Plan.

- a. Pursue legislative options for effectively incorporating the ELP into public education.
- b. The Public Education Department identifies key staff for implementation of the ELP, provides input for ELP updates, and participates in exploring legislative options for effectively incorporating ELP into public education.
- c. ELP is updated at least every five years.

Objective 2: Establish an implementation strategy for the New Mexico Environmental Literacy Plan.

- a. Create an ELP Implementation Advisory Board that includes NM PED, nonprofits, tribal organizations, government agencies and businesses.
- b. Encourage educational organizations, nonprofit partners, and governmental agencies within the state to incorporate appropriate sections of the ELP into their mission, goals and or strategic plans.
- c. The Public Education Department identifies key staff for implementation of the ELP and participates in the Implementation Advisory Board.
- d. Develop an inventory of existing educational funding sources and initiatives that could support the goals of the ELP. These include Race to the Top, STEM initiatives, Secondary School Reform, Title II and V, Perkins grants, Math and Science Partnership grants, business and industry grants, etc.
- e. Identify businesses, government agencies, educational funding sources, and organizations willing to make financial commitments to implement the plan, including funding for field trips, site visits, internships, administrative support for environmental education centers, curriculum development, dissemination of best practices activities, and professional development.



TEACHER PROFILE



There are excellent examples of public school teachers who meet their responsibilities to teach state standards while integrating environmental education into core subjects.

Wilson Middle School

Mary Erwin

Mary Erwin has been engaging students in school gardens for over eight years. In her 24 years of teaching in New Mexico, she has remained dedicated to science curriculum through discovery in the environment. Student's in Mary's classes witness and question connections among the biotic and abiotic world through their engagement in gardens. She says that gardening "allows for authentic learning instead of learning from a scripted system." Her students not only nurture food through growth, but also get to taste the nourishment of their garden.

Mary's students at Wilson Middle School in Albuquerque have access to a ½ acre garden and an edible forest which they use to study Earth Science topics and to design and study ecological impacts of changes in the school campus. Mary was one of the primary authors of the handbook, *Growing the Outdoor Classroom: A handbook on Gardening in Albuquerque Public*



Schools.

Mary's passion for the environment spreads to her students through enthusiastic guidance and role modeling. Due to her interest in citizen science, students for the last eight years have collected data for long-term ecological monitoring at the Rio Grande Nature Center State Park. While there, through the Bosque Ecosystem Monitoring Project (BEMP), students analyze leaf litter, identify plants and animals and determine the level of the water table.

Mary's delight for discovery helps encourage students to step outside of themselves and make their own discoveries. She reflects that "every time a student finds a cicada exoskeleton for the first time, I get to see them wonder. That is a gift I cherish."

TEACHER PROFILE

Teachers all over New Mexico have found ways to excel at teaching environmental education within the context of existing standards.

Place-Based Education on the Navajo Nation

Jennifer Choate

Jennifer Choate's students learn about their environment through hands on activities, shared stories, technology and field trips. Whether they're building local landforms out of clay or embarking on a geology road trip they're empowered to ask questions and make their own discoveries.

Before getting the students outside, she had her 2nd and 3rd graders make clay landforms and share stories they knew about local places like Navajo Mountain and Shiprock pinnacle. Then they were given a mystery rock to contemplate and encouraged to develop their own hypothesis about natural processes.

Utilizing available technology, her 4th and 5th grade class learned about how the Colorado Plateau was formed by engaging with an interactive geology game called *Landform Detectives*. Once prepared with an understanding of earth's shifting systems, they joined mentors



Mr. Clifford and Mr. Joe on a geology trip to find natural sand. In one wash, students found six different colors of sand and learned what minerals caused the colors. Mr. Clifford shared cultural stories and information of how the land formed.

Jennifer Choate (formerly Evans) teaches elementary gifted students in Shiprock, NM. She credits Bioregional Outdoor Education Program (BOEP), ANOVA Science Research Investigation Process (RIP), mentors Mr. Arnold Clifford and Mr. Eugene Joe, and the Bisti Writing Project for helping her to become a better environmental science teacher.

This year her students are focusing on water conservation and learning about the water cycle through interactive learning. They visit a site with two waterfalls to explore water and energy in the environment, and to Durango discovery museum to further explore natural energy.

When she can't take her students on a real field trip, Jennifer utilizes the internet for a tech-teaching day of virtual discovery. Through websites like the EPA's Take a Climate Change Expedition, students can interactively explore a vast issue in small sections.

MODEL EE PROGRAMS—NONPROFIT

There are a number of high quality nonprofits that partner with schools to provide environmental science, consistent with CCSS, NGSS and other State Standards.

Asombro Institute for Science Education

The Asombro Institute for Science Education is a nonprofit organization dedicated to increasing science literacy by encouraging hands-on exploration of science in the local ecosystem. Asombro reaches more than 17,000 kindergarten through 12th graders annually with award-winning, inquiry-based programs that take place in classrooms, schoolyards, and the organization's 935-acre Chihuahuan Desert Nature Park near Las Cruces.

While Asombro's programs cover a diverse range of science topics, all programs are aligned with each grade's standards and allow students to engage actively in projects. Thanks to collaborations with local scientists, all Asombro programs are based on the most current scientific questions and discoveries. For example, 7th graders might use dust collectors in their schoolyard to study wind erosion, play a Chihuahuan Desert carbon cycle game, or identify plants and contribute to long-term studies of plant phenology on a hike at the Chihuahuan Desert Nature Park. For more information, please visit www.asombro.org.



On field trips to Asombro's nature park, students participate in real science experiments, such as this investigation of the effects of reduced precipitation on plants, simulated by rainout shelters that deflect 50% of the rain.

Asombro's classroom and schoolyard programs open students' eyes to the wonder of science. Programs increase students' science literacy and allow them to see themselves as future scientists, often for the first time.



MODEL EE PROGRAMS—NONPROFIT

Whitfield Wildlife Conservation Area



The Whitfield Wildlife Conservation Area (WWCA), a program of the Valencia Soil and Water Conservation District (VSWCD), is located in Valencia County one mile north of Belen and just east of the Rio Grande. The Friends of Whitfield Wildlife Conservation Area (Friends of Whitfield) promotes wildlife conservation and environmental education. WWCA attracts a diverse group of tourists, birdwatchers, hikers, and students who want to learn about wetlands ecology in an otherwise arid place. Students and teachers, especially those in the 4th grade program, utilize the outdoor classroom in which to explore the natural world where they can better understand life science and environmental concepts. Local residents and community groups come to Whitfield and participate in the restoration effort that is ongoing and to enjoy exploring the natural world in this important community resource.

During the 2013-2014 school year volunteer educators had 5017 contacts, most of which were with students in Belen and Los Lunas. The education program accommodate requests from teachers of all grade levels, but their emphasis is on delivering the 4th grade program, *Birds of a Feather Explore Together* developed by Audubon New Mexico educators. This program consists of four visits to the classroom and one trip to the Conservation Area. Friends of Whitfield provides funding for the education program, including bus grants. For many teachers, the program is a critical component of their students' science education.



EE PROGRAMS—NONPROFIT

Talking Talons Youth Leadership

Over the past 25 years, Talking Talons Youth Leadership has reached generations of students in New Mexico, spreading a message of science, conservation and stewardship. With its diversity of programs, curriculum, events and initiatives, it is one of New Mexico's excellent examples of environmental education in action. Each year, they help to educate hundreds of students through a variety of different programs and events that they host (or help host). The curriculum and activities they bring both into and outside of the classroom help students develop stronger bonds to their local wildlife as well as a deeper sense of stewardship for their environment.

Their Collaborative Forest Restoration Program (CFRP) engages students in pre- and post- ecological monitoring activities as part of forest restoration. Students of all ages and academic levels, from elementary through college, will work on different tasks in the program. Their Bernalillo County program works with host teachers and schools to educate children about a wide variety of environmental issues and concepts while keeping in step with the state's grade-specific common core standards. Students who take part in the program engage in active learning through experience with live animals and work with experts in the field. The activities promote healthier habits and teach students how to teach others, creating positive role models for their peers and other youth.



Talking Talons Youth Leadership students conducting ecological monitoring.

Audubon Programs Offer Standards-Based EE



Photo: Audubon New Mexico

Audubon New Mexico's environmental education programs encourage children to interact with nature through hands-on activities that introduce key scientific concepts. Audubon's *Birds of a Feather Explore Together* is an inquiry-based, standards-based curriculum, devoted to birds, in which we successfully reach students by utilizing birds as a gateway to nature. All of Audubon's programs are designed to meet the State of New Mexico Life Science Standards, Common Core State Standards and Next Generation Science Standards, and blend scientific concepts with literacy, math, history, and inquiry. Students explore and investigate their natural world, utilizing the outdoors as their laboratory and experiencing first-hand the knowledge learned in the classroom.

More than 25,000 New Mexicans are engaged in Audubon's educational programs and conservation actions. In 2012, we worked with over 8,000 students, serving 73% Latino, 15% Anglo, 10% Native American, and 2% of other demographic backgrounds, with the majority in the very low income range (69%). Audubon New Mexico has successfully implemented our *Birds of a Feather Explore Together* program in several underserved communities across New Mexico – including Las Cruces, Hatch, Roswell, Socorro, Belen, Los Lunas, Bernalillo and Albuquerque, as well as the Pueblos of Sandia, Santa Ana, Kewa, Cocihiti, Tesuque, Santa Clara and Ohkay Owingeh. Audubon also owns and manages the Randall Davey Audubon Center & Sanctuary in Santa Fe where we work with Santa Fe Public Schools and others.

EE PROGRAMS—NONPROFIT AND GOV'T

Albuquerque Public Schools and the State of New Mexico partner to provide experiential environmental education to every 5th grader in Albuquerque Public Schools.

Sandia Mountain Natural History Center

The Sandia Mountain Natural History Center (SMNHC) is an environmental education center located in Cedar Crest, New Mexico, east of Albuquerque. With incredible foresight, the Albuquerque Public School (APS) Board purchased 128 acres of land adjacent to the Cibola National Forest in 1967. The facility served as an outdoor education center by APS until 1991 when budget constraints threatened the program. In 1993, APS joined forces with the New Mexico Museum of Natural History and Science and since then the organizations have collaborated to teach over 180,000 students about the beauty and interconnectedness of nature and their role in conservation. The main focus of this unique partnership is the *Ecology Field Program (EFP)*, an integral part of the APS fifth graders' life science curriculum. The *EFP* is a four and a half hour, standards-based field experience that consists of a short introduction to ecosystems in one of five outdoor classrooms; a two and a half hour hike where the interconnectedness of the ecosystem is highlighted through inquiry-based science activities and another hands-on learning activity. APS and the museum look to expand programs to other grades.



Federal Partners

US Fish and Wildlife, the Bureau of Land Management, US Park Service, and US Forest Service all have educational outreach programs that are available to schools. Some offer in-class presentations and/or field trip opportunities. The Valle de Oro National Wildlife Refuge is offering programming to schools and has begun offering on-site EE, even before their education facilities are built.



EE PROGRAMS—GOV'T AND HIGHER ED

New Mexico State Parks Outdoor Classroom Program

The New Mexico State Parks Outdoor Classroom Program (OCP) connects New Mexico children to the outdoors and to their heritage while supporting academic success by sponsoring school field trips, curriculum guides, and teacher professional development.

Since 2007, State Parks has reached over 135,000 students with meaningful, hands-on programs. The program is partially funded through the Kids 'n Parks personal-income tax check-off, which provides State Park field trips for students throughout the state. In order to ensure success, State Parks conducts teacher trainings, and also evaluates the success of the program through consistent teacher evaluations.



University Partners—BEMP

The University of New Mexico's (UNM) Biology Department has a unique partnership with the Bosque Ecosystem Monitoring Program (BEMP – www.bosqueschool.org/bemp.aspx) and New Mexico's public, private, pueblo, charter, parochial and home school youth. BEMP, a long term citizen science monitoring program established in 1996, engages local students on their home landscape. Students are transported from their school campus to the local bosque, or forest, to collect biotic and abiotic data. Here, along the banks of the Rio Grande, students grades 2-12 work with UNM Biology 408L students and BEMP staff to monitor watershed health. Monitoring occurs monthly and includes the following parameters: depth to shallow groundwater table, precipitation and leaf litterfall. Accessory collections like surface active arthropods traps, water quality and chemistry as woody debris are also collected through the school year. Data is made available to University researchers, government agencies and non-profits working to manage the landscape.

University students learn about the local bosque, create and present environmental education activities to their peers, and work to mentor students in the field each month. Additional UNM resources like bug vouchers, aquifer models, field equipment and professional scientists as mentors help BEMP make connections with local youth.



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